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ENVIRONMENTAL QUALITY

No. 276

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SOVIET-FRENCH ENVIRONMENTAL MEETING REVIEWED

LD260055 Moscow TASS International Service in Russian 0816 GMT 25 Oct 80

[Text] Paris, 25 Oct (TASS)--Cooperation between the USSR and France continues to develop successfully in various spheres and directions in the interests of the two countries, peace and detente. This is shown by the fifth meeting which has just been held in Paris of the Soviet-French working group on environmental problems.

The participants in the meeting summed up the results of cooperation in the past 5-year period, reviewed questions of cooperation for 1981-2 and also the program for exchange of specialists for 1982. The sides noted that the program of cooperation as a whole is being successfully implemented, in particular in the sphere of atmospheric pollution, improving methods of treating effluents in the oil industry and petrochemical complexes.

Satisfaction was expressed at the meeting with regard to the participation of representatives of industry in implementing the exchanges and the wish was expressed that such participation should be extended in the future to all questions of cooperation. The French side proposed a new theme of cooperation on waste-free technology which was supported by the Soviet delegation.

The published protocol of the working group's meeting stresses that Soviet-French cooperation in the sphere of environmental protection is developing on a mutually advantageous basis and is promoting progress in solving these problems in both countries. The next meeting of the group will be held in the autumn of 1981.

The meeting of the working group took place in an atmosphere of friendship and mutual understanding, Pierre Woltner, deputy head of the board for prevention of pollution of the Ministry of the Environment and Living Conditions and head of the French delegation, stated in an interview. We express satisfaction with the great volume of work that has been done. The meeting which has just ended, shows that Franco-Soviet cooperation in the sphere of environmental protection is becoming ever more concrete and fruitful year by year.

CSO: 5000

DUMPING RADIOACTIVE WASTES IN PACIFIC OPPOSED

Rally Demands Cancellation

OW251243 Tokyo KYODO in English 1207 GMT 25 Oct 80

[Text] Tokyo, 25 Oct (KYODO)--Some 1,500 citizens rallied Saturday to demand that the government cancel its plan to dump radioactive wastes into the Western Pacific. The meeting was sponsored by civic organizations opposing nuclear power plants, the General Council of Trade Unions of Japan (Sohyo) and the Japan Socialist Party as a main event of the day of antinuclear power activities.

Among the participants were Mayor Philip Mendiola of Tinian, Marianas Islands, and Mick Miller, representative of the Australian aborigines opposing uranium ore mining destined for export.

Addressing the meeting, Mendiola said, "We shall stage actions if Japan carries out the dumping plan." Miller called on a joint campaign against the mining between the aborigines and the Japanese people. The participants staged a peace march through downtown Tokyo later in the day.

Protesters' Threat of Blockade

OW281025 Tokyo KYODO in English 0919 GMT 28 Oct 80

[Text] Tokyo, 28 Oct (KYODO)--Protesters against Japanese plans to dump low-level nuclear waste in the Pacific Ocean will blockade any Japanese vessels carrying the waste, a protest leader said here Tuesday. He was David Rosario, a spokesman for the Marianas alliance against nuclear waste dumping, who was speaking at a seminar at the Foreign Correspondents' Club.

He said he had had talks in London with leaders of the Greenpeace Organization, which had sent a ship to protest against French nuclear testing in the Pacific, and this group had promised its support.

He also said that lawyers associated with his organization were studying methods to bring Japan before the World Court, in relation to its dumping plans.

According to the Japanese plan, about 10,000 drums of low-level radioactive waste from nuclear power plants are to be discarded in the sea some 900 kilometers north of the Northern Marianas starting in autumn next year.

"The people of this area feel Japan is committing a criminal act," said Rosario. "We have already suffered, in the Second World War, from the Japanese military, and now we wonder why Japan is trying to impose more suffering." He said that he had come to Japan to campaign against the dumping, and had visited 22 cities in 12 days.

Another speaker at the seminar was Mick Miller, an Australian aboriginal, and chairman of the North Queensland Land Council. He said he had come to Japan to campaign against the planned mining of uranium from Oenpelli, 200 kilometers southeast of Darwin. He said Japan was strongly supporting the mining, because it planned to purchase much of the output.

"We oppose the mining because it is on our sacred land, which has great anthropological significance," Miller said. "In addition, seepage from the waste from the mines will run into the rivers in a few years, and could wipe out much of the wildlife in the area. But the aboriginals living there still depend very much on this wildlife for their food.

"Japan is a part of this destruction, and we accuse the Japanese Government as much as the Australian Government of being a party to the genocide of the aboriginal people.

"Japan put pressure on Australia to hurry up with the mining, and the Australian Government buckled under to this pressure, and in turn put pressure on the aboriginals," Miller said.

Marianas Mayor Opposition

OW290805 Tokyo KYODO in English 1652 GMT 29 Oct 80

[Text] Nagasaki, 29 Oct (KYODO)--Mayor Felipe Mendiola of Tinian, Northern Marianas, Wednesday virtually refused entry to his island of a second Japanese Government mission to explain a plan to dump radioactive wast near the Marianas. He told reporters that the dispatch of the mission to Tinian will only invite local opposition to the project.

The Japanese Government's Science and Technology Agency plans to send the second mission to the Pacific islands early next month as it did last August. It hopes to dump some 10,000 drums containing low-level radio-active waste from Japanese nuclear power plants in the sea about 900 kilometers from the Northern Marianas starting in autumn.

Mendiola is visiting Japan to protest against the Japanese Government's plan.

Prior to the press conference, he laid a wreath at the Nagasaki Peace Memorial and paid homage to the 1945 atomic bomb dead.

CSO: 5000

DELEGATES TO PEOPLE'S CONGRESS SUGGEST POLLUTION CURES

Beijing GONGREN RIBAO in Chinese 11 Sep 80 p 3

[Report by Chen Bei [7115 5563]: "Building Four Modernizations Will Be Difficult Unless 'Three Wastes' Are Controlled"]

[Text] These days, the delegates to the People's Congress from the industrial front of Hubei Province, sitting around a long table in a bright and spacious conference room, happily discuss affairs of state and say whatever they want to say.

These delegates include the secretary and chairman of the Provincial CCP Committee, engineers, industrial managers, labor union workers, labor models on the industrial front, and ordinary workers. The difference from the past is the fact that they had sufficient preparation before leaving for the capital. They extensively gathered the opinions of the masses. In addition to discussing conference documents, at group meetings they poured out the criticisms and suggestions of the people with respect to the work of the government in all aspects. At a group meeting, Fan Zhongzhi [5400 1813 1807], deputy chief engineer and worker at the Jiangan Vehicle Plant, a national labor model, and a member of the Standing Committee of the People's Congress said: "I am a representative of the people and want to speak and do things for the people." He had before him several registered letters mailed to him by the masses, entrusting him to report on conditions to the congress. Although he is already 70 years old, in a vigorous spirit he spoke forcefully about problems of urban construction and environmental protection, etc., and offered many valuable opinions.

The delegates believed that the present government can truly represent the will of the people. In his report, Comrade Peng Zhen emphasized the importance of enacting the Environmental Protection Law and explained the utmost concern of the state for the spiritual and physical well-being and livelihood of the people. Everyone must realize, however, that to carry out this work well, specific measures must be adopted. The meeting disclosed the extreme seriousness of environmental pollution problems in cities like Wuhan, Huangshi, Yichang, etc. For example, the Donghu [Lake] of Wuhan is one of the key scenic areas of the country. Around the lake there are eight water plants which supply the drinking water for 700,000 persons, but the quality of the water has become seriously polluted. Worker engineer Xu Baixun [1776 0130 8113], chairman of the workers' union at the Wuhan Diesel Engine Plant and a provincial advanced producer, said: "The industrial wastewater of the entire city of Wuhan flows into the Huangxiaohe. The water of that river has five or six colors and a noxious odor. It has become the 'Longxugou' of Wuhan. The water of that river flows into the Changjiang, polluting the water there as well causing the masses to be very worried." Li Quansheng [2621 0356 0524], the party branch secretary of the Xiongjiaban coal mining district of Huangshi city and an advanced producer of the province, said: "In the past, Huangshi was known as the 'City of Brilliance'; now it has become a 'city of shining dust.' Dust particles fall from the sky like rain, causing passers-by to be unable to open their eyes. Each year, the city releases into the sky various toxic elements in smoke averaging 80-90 tons per square kilometer--12 times the state's standard (the standard of the state being 6-8 tons). In some areas the falling dust particles reach as much as 204 tons, several tens of times the state's standard. The water pollution is even worse. The city discharges 100 million tons of industrial liquid waste per year, causing the water of Dayehu, Qingshanhu, Nanhu and the Huangshi section of the Changjiang to be seriously polluted. Qingshanhu was originally a scenic area as well as an area of fish and marine products culture. Now the mountain is no longer observable and the water is no longer clear. It is now a "stinking water lake" where the smallest fish cannot live. The waste residue of industries is discharged at a rate of more than 1.2 million tons a year, invading the farms and obstructing the stream channels. Of the 40,000 mu of fields inspected and monitored, the cadmium content of half of the rice grains was found to be four times the international standard, thus having a serious effect on the health of the people.

With respect to solutions to this problem, the delegates were all eager to offer their opinions. Yang Jiudong [2799 0046 2639], a machine shop chairman of the Wuhan Steel Plant No 2, believed: "Although the Environmental Protection Law has been enacted for test implementation, inperfections in the law have been sensed in the implementation process. Newly built plants are put into operation as soon as the main plant is completed, with the result that, while the old pollution problem has not yet been resolved, new pollution is emerging. There is no rule in the law to take care of this. As far as penalties are concerned, some localized regulations were formulated by local jurisdictions. But Wuhan Steel is a unit with expanded enterprise autonomy. It would not allow the use of its own money to resolve the problem of the "three wastes," but would only allow itself to pay the penalties. It paid 6.43 million yuan in 1 year's time. Half of that sum was used to resolve the problem of regional pollution, and the other half was used for other matters. Consequently, penalties were paid but the plant's pollution problem went on."

Some delegates believed that environmental pollution is a serious problem all over the country; therefore, it is difficult to resolve it without capital investment from the state. There were also some delegates who believed that it would be difficult to depend entirely upon capital investment by the state. They felt that the industry itself must increase production and practice thrift to resolve the problem. Gu Dachun [7357 1129 2797], deputy chairman of the National Workers' Union and a delegate to the People's Congress, believed that the money paid as penalties should be used mainly to control the "three wastes," and that a law should be enacted to guarantee that the special fund would be spent for that special purpose.

Han Ningfu [7281 1380 1133], secretary and chairman of the Hubei Provincial CCP Committee and a delegate to the People's Congress, said: "The problem of pollution is a great problem relating to the lives and health of the people and posterities; there must be determination to find an early sollution. The problem will grow more serious if it is [allowed to] drag on, and more money will have to be spent. This is a lesson learned from many industrially developed countries." He said that he had learned from his trip to Japan that Japan uses about 25 percent of its construction funds to resolve the problem of pollution. This should serve as a worthy reference for China. In conclusion, delegate Fan Zhongzhi suggested--and the four delegates Yang Jiudong, et al, seconded the motion--that an appeal be made to all related departments to adopt effective measures to resolve this great problem affecting the health of the people. The motion was unanimously agreed upon by the comrades of the group. The motion requested the state to set aside 10 percent of the basic construction fund to be a special-item capital, monitored by the bank, and spent for the special purpose. All industries failing to control pollution beyond a time limit should pay a penalty; 60 percent of the penalty paid should be used to treat the "three wastes" of that industry, 30 percent should be used for regional pollution control and 10 percent would go for administrative expenses. The income from the increase in production and the savings of the industry should be used for treating the "three wastes" as a priority item. In this manner, the central and local jurisdictions could be coordinated in the struggle for a basic resolution of the pollution problem within 3 to 5 years.

The related departments of the State Council also assigned persons to participate in the group meeting and to earnestly listen to the opinions of the delegates.

6168
CSO: 5000

STRONG APPEAL MADE TO RESOLVE 'THREE WASTES' POLLUTION PROBLEM

Factories' Liquid Waste

Guangzhou NANFANG RIBAO in Chinese 20 Sep 80 p 1

[Text] The more than 10 specialists and professors of the Provincial Political Association Guangzhou City Environmental Protection Work Observation and Inspection Group inspected Yuancun District's condition of pollution and its control of industrial three wastes on the 18th. Yesterday, they held a discussion meeting at the Provincial Political Association and proposed opinions with regard to the industrial three-wastes problem in Guangzhou and the entire province.

The specialists pointed out at the discussion meeting that "since 1958, 20 factories and 2 water supply plants have been built in Yuancun District. When these factories were constructed, as a rule, three-waste treatment facilities were not built at the same time. Every day, more than 400,000 tons of liquid waste was discharged by these factories, in addition to 8,000,000 m^3 of harmful gases and 600 tons of industrial residue. Every day, the Guangzhou Nitro Fertilizer Plant alone discharges more than 200,000 tons of liquid waste, containing 2.2 mg of cyan, 7.2 mg of arsenic, 52.7 mg of fluorine per ml of liquid waste, being several to several tens times higher than the state's standard. Although the factories of this district have adopted some measures of three-waste treatment and obtained some results, the problem of pollution remains unresolved. According to the inspection of the water of the Yuancun water source by a related department, such water quality indices as phenol, soluble oxygen, etc. and the turbility and coloring do not coincide with the regulated indices of the state, sometimes surpassing the state's standard 1-5 fold. The water of the water source is seriously polluting the drinking water of the nearby residents, the water used by the fishing industry, the water used by the farms, and the water used by the industries. Agricultural production and the health of the people have both been damaged. Based upon the above condition, the specialists and professors of the inspection group strongly appeal to the leadership and related departments to adopt effective measures immediately to resolve the three-waste pollution problem so as to protect the health of the people.

New Water Waste Technology

Beijing BEIJING RIBAO in Chinese 10 Sep 80 p 2

[Text] The joint research of the Municipal Institute of Environmental Protection Sciences and Beijing Second Metrological Instrument Plant succeeded in creating the reverse flow bleaching--thin film evaporation closed cycle system to resolve the problem of environmental pollution by the liquid waste of chrome and nickel plating. On the 8th of this month, the Municipal Bureau of Environmental Protection and Municipal Technological Exchange Station called an on-site conference at the state-operated Changcheng Optical Instrument Plant to introduce the new technique to the related central, municipal, district, and county bureaus and related departments and plants. The problem of environmental pollution from the liquid discharge of the electroplating industry is an old and difficult one. For example, the chrome plating liquid waste containing hexavalent and trivalent chromium is discharged underground, to affect the source of water supply. When the polluted water enters the human body, it can cause diseases of the digestive and skin systems and it also has carcinogenetic action. The city has more than 600 electroplating industries.

Although chemical and ion exchange methods were used in the past to treat the chromium-containing liquid waste, many shortcomings existed, including problems of sediment settling and secondary pollution, or due to high investment cost and complexity of technical management, these methods had been very difficult to extend. The Municipal Institute of Environmental Protection and Beijing Second Metrological Instrument Plant succeeded in making the reverse flow bleaching—thin film evaporation closed cycle system. On the basis of guaranteeing the quality of the washed plated items, a system that never discharges chromium-containing liquid waste is thus materialized and the environment protected. Due to the fact that the system reclaims the chromium anhydride and the flushing water is cyclically reused, the electroplating raw materials and a large quantity of the city's water supply are saved to achieve the goal of comprehensive utilization as well as some economic benefits for the industry. The investment cost of this set of equipment may be recovered within 2-3 years, generally.

The Changcheng Optical Instrument Plant's leaders and masses are very interested in environmental protection. As soon as the news was out, they immediately came to view the system and to sign an order for the equipment. When it was delivered, the workers were organized to install it in a hurry so that it was quickly in operation. After 2 months of application, the effects of the system were found to be obvious. The Second Metrological Instrument Plant produces the set of thin film vaporizer. Its major technical and economic indices are approaching and surpassing the levels of the same type of products made in Japan.

At the on-site conference held on the 8th, many comrades believed that his type of thin film vaporizer equipment is advanced, simple, convenient to operate, taking up only a small area, having high evaporation efficiency, and good separation results. It was judged to be a relatively ideal method of resolving the problem of environmental pollution from the liquid waste of chrome and nickel plating. Furthermore, this set of equipment may also be used to treat the liquid waste of copper, zinc, gold, silver, and cadmium plating.

6168
CSO: 5000

HISTORY OF KESHAN DISEASE, GEOLOGICAL ROOTS DISCOVERED

Guangzhou HUANJING [ENVIRONMENT] in Chinese No 4, 30 Aug 80 p 6

[Article by Li Renshan [2621 2773 [illegible]]: "Villages of Death"]

[Text] In some places in the northeast and northwest of China, off in the distance may be seen a village, a few trees, and houses, but upon approaching more closely there are no signs of people or of livestock, nor can a sound be heard. All that meets the eye is a scene of crumbling walls and dilapidated houses. This is not a product of the ravages of war, nor is it the consequence of a natural calamity; it is a "village of death" such as one frequently sees in an area heavily hit with Keshan disease.

Keshan disease is a localized disease. This acute illness was first discovered in the winter of 1935 in Keshan County, Heilongjiang Province. Sufferers would spit up yellow liquid, some had pains in the pits of their stomachs, and the death rate was very high. At the time, the cause of the disease was unknown, and so it was called Keshan disease. Later on, after further investigation, it was found that this disease had broken out as early as 1900, and in 1937, 500 people died of this acute disease in three villages in Keshan County. In 1948, the total number of patients throughout the northeast who died of it was more than 1,300. In Huanglong County in Shaanxi Province, in China's northwest, the outbreak of the disease was the worst in the entire country. In Fuming village in that area, over 20 of the slightly more than 30 villagers died, and those fortunate enough to survive abandoned their homes and land to escape to other villages.

What is the relationship between Keshan disease and the geographic environment? Following liberation, the state established a special agency to conduct large-scale research into Keshan disease. They learned that the disease had appeared in more than 200 counties and municipalities in 14 provinces and regions of China. Ever since 1967, the Environmental and Regional Diseases Unit of the Institute of Geography of the Academy of Science has conducted investigations into the illness and the environment in more than 100 counties in 9 provinces. They have collected and analyzed a large amount of drinking water, soil, grain and vegetables, and even hair and wool samples, finally preparing a map for the entire country showing the distribution of Keshan disease, in a preliminary effort to figure out the laws governing the geographic distribution of Keshan disease. It was particularly heartening to find that experiments confirmed evidence of a relationship between

Keshan disease and a lack of "selenium" in the environment. As early as 1960, clinical experiments in which sodium selenite was used to prevent Keshan disease proved successful. During the 1970's, further scrutiny was given to the serious lack of selenium in the environment in areas where the disease had occurred. Daily intake of selenium into the bodies of the local people amounted to only slightly more than 10 micrograms. Next, experiments were undertaken in which large doses of selenium given to the people in areas of the disease, and very good prophylactic results were obtained. Subsequently, sodium selenite applications were made to the environment, so that every link in the ecological system showed a striking increase in selenium content. The ingestion into the human body of selenium also increased greatly, with excellent prophylactic and therapeutic results for Keshan disease.

There are two outstanding characteristics concerning the areas of distribution of Keshan disease. For the most part, these are in the temperate zone to warm belts of deciduous forested plains, and in areas of brown and drab soil systems where there are damp forests. Typically, alluvial plains within the disease zone are free of the disease. The inference from these characteristics is that Keshan disease results from the washing away of the element or of its chemical compounds required for metabolism by the cardiac muscles. Alternatively, some harmful elements or chemical elements that impede myocardial metabolism build up in opposition, thereby leading to an outbreak of Keshan disease. Moreover, in terms of natural conditions and the characteristics of chemical geography, the Keshan disease zone in China is located in the transitional zone between the southeastern damp area and the northwestern dry area, where the leaching and washing away of chemical elements and chemical compounds are intense. Consequently, the lack of certain elements and chemical compounds in the disease zone makes for a greater possibility of outbreaks of Keshan disease.

As of now, it has been discovered only that a lack of selenium is a factor leading to the disease. Adding selenium to the environment is an effective way to prevent and control Keshan disease. This is only the first breakthrough; further intensive research may discover that there are other effective elements, aside from selenium, for guarding against and controlling Keshan disease. We will work hard to unravel as soon as possible this mystery of the "villages of death."

[illegible]
CSO: 5000

USES OF OXIDATION PONDS TO PURIFY WATER DISCUSSED

Beijing HUANJING [ENVIRONMENT] in Chinese No 4, 30 Aug 80 p 19

[Article by Yang Baohua [2799 1331 [illegible]]: "Use of Oxidation Ponds to Purify Wastewater"]

[Text] Oxidation ponds are also known as biological ponds or settling ponds. The oxidation pond method is a biological treatment method, and that which is to be treated is organic wastewater. Oxidation ponds are either manmade or have been transformed from natural lakes or ponds to grow large quantities of microorganisms. Oxidation by bacteria breaks down the organic material in wastewater. The way it works is as follows: organic material in wastewater + bacteria + nutrients + oxygen → new bacteria + CO_2 + H_2O + remaining organic material and inorganic material, with the wastewater being purified. Oxidation ponds are subdivided into aerobic ponds, facultative ponds, and anaerobic ponds.

Aerobic ponds use aerobic bacteria to oxidize and break down organic wastes. The required oxygen is provided by the photosynthesis taking place in the algae that grow and reproduce in the pond. Through the synthesis of CO_2 and H_2O into a new-cell carbohydrate with the liberation of O_2, the water becomes purified.

In facultative ponds, since the top and bottom layers of the water in the pond are not evenly mixed, the lower layer of the pond frequently lacks oxygen, and anaerobic bacteria are sometimes dominant there, while in the top and middle layers, aerobic bacteria are dominant. Both aerobic and anaerobic bacteria work to decompose organic materials.

Anaerobic ponds are completely lacking in oxygen. Anaerobic bacteria degrade the organic matter in wastewater and assimilate part of it to produce new cells. They liberate the gases H_2S, NH_3, CH_4, and CO_2 in the decomposition of organic matter, and the water becomes purified. The anaerobic pond method works best with highly viscous organic wastewater (such as wastewater from distilleries, wastes from alcohol industries, and wastewater from the washing of fats and oils from the wool of sheep, where the quantity of BOD_5 is greater than 5,000 to 10,000 milligrams per liter) which anaerobic bacteria can decompose well.

Oxidation ponds require simple structures, they do not call for large amounts of complete sets of equipment, construction costs are low, the circulating capital required is small, large numbers of technicians are not needed to operate them, and management is easy. Their shortcomings are that they take up a lot of room and are greatly affected by the seasons.

As long ago as the 1950's, some people in China were engaged in research in the use of oxidation ponds to process wastewater, and they gained a certain amount of experience. During the last 10 years, however, work of this kind has not progressed rapidly, and some people have even felt that these methods were backward and that there was no future in their development. This in fact is not the case. The use of the oxidation pond method to process wastes is still widely used today in some technically advanced countries. The United States has more than 20,000 waste-processing plants, in one-third of which the processing of wastes is done in oxidation ponds. At the (Kaiser) Steel Mill in the United States, a two-stage oxidation pond has been built in a nearby lake. Daily water consumption by that plant for production amounts to 240,000 cubic meters (equivalent to the daily water needs of a city with a population of 2 million). Wastewater from the blast furnaces is allowed to stand for 10 days, and other wastes are allowed to stand for 5 days, with all wastewater successfully processed except for water used in the pickling process; this includes water from the coking plant and water used to wash blast furnace coal gas, which contains phenol. Under normal circumstances, the water from oxidation ponds is comparable to that from rivers. The American experience demonstrates that processing urban wastes in oxidation ponds eliminates disease bacteria, and fish can be raised in them without further sterilization. Hong Kong has built six oxidation ponds to process wastewater. Third world countries are also in the process of popularizing the use of oxidation pond method to purify wastewater.

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CSO: 5000

NEED TO CONTROL POLLUTION FROM COAL, COKE INDUSTRIES

Beijing HUANJING BAOHU [ENVIRONMENTAL PROTECTION] in Chinese No 4, 1980 pp 10-13

[Article by Wang [illegible] [illegible]: "Environmental Pollution Problems of Direct Combustion of Coal and the Coking Industry"]

[Text] China has rich coal resources. There are all types of coal, and their distribution is extensive. Coal is the major nonreusable energy source and an important raw material for industrial production as well. It is an indispensable material foundation of the realization of the four modernizations.

Coal is a mixture of many complicated organic compounds, inorganic elements, and free mineral substances. Among the components of coal, the major elements making up the organic compounds are no more than the five kinds of carbon, hydrogen, sulfur, nitrogen, and oxygen, but the formation of the compounds is extremely complex. There are also some small quantities of nonmetallic elements such as phosphorus, arsenic, chlorine, fluorine, etc, and some loose elements; some of these are combined into organic compounds as well. Coal is a polymer. Its structural unit is a condensation aromatic ring, but the same type of coal is not constructed simply with one type of molecule. It is constructed in giant molecules of different degrees of polymerization, and their molecular weight increases with the degree of metamorphism of the coal. At the edge of these giant molecules there are fatty hydrocarbon side chains and oxygen-containing functional groups; these also become shorter and fewer with the degree of metamorphism. Coal molecular polymer also gradually turns toward a directional arrangement, as the degree of metamorphism becomes deeper, to approach the carbon atomic network of graphite and to have some crystalline characteristics.

The inorganic components of coal generally are possessed by the original coal-forming plants. Their number is relatively few. There are also various paragenetic minerals with the coal seam, and they become mixed in the coal during the mining process. Most of these external minerals may be separated from the coal through various washing and selection processes. Among the contents of coal, one of the chief sources of pollution is sulfur. During direct combustion of coal, sulfur is oxidized into sulfur dioxide and released into the air to become the major factor in atmospheric pollution. Measures therefore must be adopted to control and reduce the dispersion of sulfur dioxide. It is necessary to install purification equipment on direct combustion furnaces to remove a large portion of the sulfur dioxide content in smoke exhaust.

The sulfur content of the coal (including inorganic and organic sulfur) produced in various areas of China varies a great deal. The general tendency is for it to increase from the northeast to the southwest, from the shallow to the deep, and from the young to the old.

At present, there are several tens of methods of removing sulfur dioxide here and abroad. These methods may be divided into two categories. One is to install desulfating equipment in a suitable place in front of the chimney. With the other category, the desulfating equipment is installed in front of the air-heating device in order to raise its temperature. The currently common methods are the following:

(1) The no soda regeneration purification method: With this method, sodium salt is used as the desulfating agent without regeneration. The rate of sulfur dioxide removal may reach above 90 percent.

(2) The calcium soda regeneration purification method: After absorbing sulfur dioxide, the waste sodium salt is precipitated with lime (or limestone) to produce calcium sufite and calcium sulfate, and the soda liquid and the sodium sulfate solution may be cyclically used. The shortcoming is the fact that sodium sulfate and calcium hydroxide do not react very well, making regeneration difficult. The rate of sulfur dioxide removal with this method is generally above 85 percent.

(3) The heat soda regeneration purification method: In the treatment process, the dissolved sodium salt is cyclically used for the removal of sulfur dioxide, which is reclaimed with the heat distillation method to manufacture sulfuric acid. The shortcoming is the need to use a washing device to remove the sodium sulfate in the discharged substance to cause a 10-percent loss. The rate of sulfur dioxide removal is about 90 percent.

(4) The magnesium oxide purification method: Magnesium oxide is mixed with water in the washing device to absorb sulfur dioxide and produce magnesium sulfite and magnesium sulfate, which may be used to manufacture magnesium and sulfuric acid. The loss of magnesium oxide is about 10 percent, and the rate of sulfur dioxide removal is about 90 percent.

(5) Limestone purification method: Initially, limestone is injected directly into the purification system, but it can easily form slag to corrode the furnace and cause an obstruction. Now the method has been changed to the use of limestone to purify the tail gas. The rate of sulfur dioxide removal is relatively lower, generally not exceeding 80 percent.

Aside from the above, other economically efficient new techniques are also being studied and developed here and abroad. For example, there is the microwave desulfation method, which may perhaps replace the currently common smoke desulfation device. The chemical desulfation method could be used to convert high-sulfur coal into low-sulfur clean fuel, and so purification equipment might no longer be needed.

Another source of pollution from coal-burning thermoelectric powerplants and industrial furnaces id dust. It contains sulfur compounds and some inorganic foreign matter. Some of these are harmful substances capable of inducing cell mutation. They are mainly compounds of silicon and aluminum and other trace or minute quantities of metals and nonmetals, including cadium, mercury, lead, nickel, chromium, cobalt, zinc, antimony, beryllium, boron, arsenic, tellurium, selenium, etc. When these compounds and elements are absorbed by the lungs through the respiratory system, they may induce disorders of some systems or may become hidden factors causing malignant tumors. There are many combustion coal furnaces and thermoelectric power generating plants in industrial cities, and every year the dust dispersed amounts to several hundred thousand tons. This quantity of dust falls onto the ground surface and the water of streams, causing environmental pollutionsand to affecting the people's health. Large-scale combustion coal and electrical powerplants, therefore, must install static-electricity dust removers (or dust-capturing devices) to reduce to a minimum the quantity of discharged and dispersed dust. At the same time, new procedures and techniques should be continuously studied and developed to remove and reclaim dust particles completely.

For the purpose of resolving the environmental pollution problems of coal combustion power generation, gas turbine generators are being studied and developed here and abroad. If it can be combined with steam turbine generators, the heat energy of coal may be utilized with much higher efficiency. The method is to convert coal into gas of low heat value, to be used as a gaseous fuel of gas turbines, but strict purification, desulfurization, and dust removal must also be carried out for the gas. The gas-producing coal gasification furnace must have a high-efficiency vortex flow separator for purification treatment through mixing and drying processes to meet complete dust-removing and high-rate desulfuration requirements. The merit of gas turbine power generators is the fact that the sulfur dioxide content of the chimney smoke of the furnace can be removed more easily, more economically, and with higher efficiency, mainly because the density of the hydrogen sulfide of the coal gas and its chemical reactivity are much higher than those of the sulfur dioxide in the chimney smoke and, at the same time, the inflammable gas is in a pressurized state before combustion; therefore, the volume is smaller and the purification instrument may be smaller as well, with the result that less energy will be used in the purification process. In order to protect the blades of the gas turbine, the existence of sulfur dioxide with its high-temperature corrosion action on the blades and the dust with its abrasive action on the blades must be prevented. When gas turbines are used to generate electricity, aside from a great reduction of pollution and improvement of the environment, coal may be more thriftly used and low heat value gas may be more economically adopted. Judging from the tendency to develop a reasonable utilization of coal, the study of high-efficiency dust removal and dry method desulfuration and the development of gas turbine power generation should be subjects that are emphasized in the future.

The nitrogen content of coal is generally not high--about 1-2 percent of the organic matter content--but owing to the photochemical smoke and fog [smog] caused by the nitrogen oxides, it produces very harmful and high-density pollution. The fixed source of nitrogen oxides is mainly (about 70 percent) industrial furnaces. At present, the new ultrasonic wave technique for nitrogen oxide removal has become available; the rate of removal is about 90 percent. It has been reported that another simple organic compound, ethane dioxane, acts in photoelectric smog; it is a cyclic compound composed of carbon, hydrogen, and oxygen. It is an organic compound of possible carcinogenesis, and its existence has been proved by low temperature mass-spectrometric tests.

To reduce atmospheric pollution caused by photochemical smog, the amount of nitrogen oxide produced may be greatly reduced, compared with direct coal combustion, when coal is converted into a gaseous fuel. For this reason, the study of coal gasification and gas combustion furnaces has important significance in the reduction and control of the discharge and dispersion of nitrogen oxides and in the prevention of atmospheric pollution and in improvements in environmental protection. Besides, when the chemical conversion and purification method is adopted to process coal into the three types of clean fuels of solid, liquid, and gaseous states, very obvious effects on the removal of such harmful substances of coal combustion as smoke, dust, sulfides, nitrides, and cyanides in either the coal processing process or the process of utilization of its products may be obtained.

The comprehensive utilization of coal, with coal chemistry as the foundation, has become an independent system among fuel chemical industries. One of the major forms of processing is the chemical industry of coking. Aside from producing the important raw mateial of blast furnace iron refining, i.e., the metallurgical coke, it also produces as byproducts coal tar, coking furnace gas, and some relatively stable organic compounds through high-temperature secondary decomposition. In the chemical reaction process of high-temperature coking, because of such reactions as decomposition, cracking, depolymerization, polymerization, and condensation of coal, some organic and inorganic compounds affecting environmental protection may also be produced. Varying with the structural composition of the coal used in coking, the chemical reactions of coking will produce many corresponding negative and positive ions, simple and complex organic compounds, various gaseous molecules, drifting dust, and powdery dust particles. These different substances produced in the coking process are sufficiently harmful to pollute the environment. For example, the fluorine, chlorine, cyan, sulfur radical, chromate radical, and hydrogen arsenate radical in the positive ion state may be stably retained in water and have a strong capacity for migration, and especially, F^-, CN^-, $HASO_4^-$, etc, are violently toxic.

Some accompanying elements of coal, such as cadium, mercury, lead, beryllium, nickel, antimony, magnesium, copper, zinc, etc, may be dissolved in water in the state of positive ions, and they also have the capacity for migration and may be easily absorbed and fixed in suspension by clays, pulverized coal, and humics. The simple organic compounds invlude phenols, phenyls, and benzils, etc, which are capable of being dissolved in water and migrating in the molecular state and can be easily absorbed and decomposed by organisms. The complex organic compounds include naphthalene, anthracene, benzo compounds, coal tar, and some compact cyclic compounds which are not dissoluble in water and can migrate in water only in a suspended state. Under the action of micro-organisms or ultraviolet irradiation, they may slowly decompose. The gaseous molecules include carbon monocide, carbon dioxide, sulfur oxide, nitrogen oxide, ammonia, hydrogen cyanide, and hydrocarbons which exist in the atmosphere in a molecular state and have a strong capacity for expansion and idspersion, but in the atmospnere chemical reactions may easily occur to produce new compounds. The drifting dust and dust particles also contain some metallic and nonmetallic elements, organic matter, carbon, and silicon, etc, with relatively stable chemical proprerties. Their ability to migrate in air currents, however, varies with the size of the dust particles.

The above substances of different states and characteristics produce and form respective sources of pollution in the various stages of the coke production procedure (including breaking, mixing, coal preparation, material packing, coke burning, pushing, and extinction, reclaiming, isolation, purification, and refining), in the form of large quantities of coal dust, smoke and ash, gaseous smoke, vapor, and wastewater. Especially if the scientific management of the various production stages of coking factories is less than perfect, the work regulation is not sufficiently strict, the equipment maintenance and repair are not timely, and the treatment of products is not suitable, the problem of pollution will necessarily become even obvious and severe. If persistent pollution-prevention measures are not adopted, unimaginable results with limitless aftereffects will necessarily be created. Even four modernization construction may be affected.

In the coal preparation and material packing processes, a large quantity of coal dust will fly all over the place, affecting the work environment. If the related equipment is properly sealed and a set of negative pressure pipes is installed, the coal dust particles will be absorbed into the vortex separator, etc, and the work environment may be improved. With respect to breaking and sifting coke, similar measures to reduce pollution may be adopted. The major source of pollution is coking plants comes from the smoking dust produced by the coking furnace; in most cases, the smoking dust is caused by the rushing flames at the furnace gate, the ascending pipe, etc. These flames may cause a great deal of waste of coal gas and chemical products, resulting in very large losses; they will also affect environmental protection and produce serious pollution and damage. This is mainly due to improper work and management of the coking furnace and the lack of a maintenance system and timely repairs. If the new technique of air-sealed furnace gate and the timely repair of the furnace gate frame are adopted, and if movable-dust removing equipment is installed atop the coking furnace, the rush of smoke may be prevented, instances of catching fire may be reduced, and sources of pollution surrounding the coking furnace may be eliminated. The hot coking ash expelled from the coking furnace is usually extinguished by the wet method; this produces a large quantity of vapor and mist, which bring many harmful substances with them to pollute the environment and the atmosphere. If inert gases (the most ideal is liquid nitrogen) are used to replace the wet method, and if the entire set of coke-extinction equipment and work procedures are improved, environmental pollution may be greatly reduced and a portion of the heat energy of the hot coking ash may be reclaimed.

In the product reclamation process (including purification, separation, and refining, etc) the major problems involve hydrogen sulfide, hydrogen cyanide, carbon sulfur oxide, sulfur cyanides, ammonia, and dephenolization of the wastewater. If these pollutants are not thoroughly purified and removed, agricultural crops, plants, marine products, and people in the vicinity will suffer directly. Even though the majority of China's coking plants are currently using low-sulfur coal for coking, the total sulfur content of the coal gas of the coking furnace after the benzene washing tower is still at times as high as 5 grams per cubic meter. This is mainly because the dry method of ferric agent desulfuration is adopted, causing the reaction process to be slow, the contact time to be long, and the flow resistance to be great, so that the rate of desulfuration is low. If the alkaline potassium method is adopted for desulfuration, the rate of hydrogen sulfide reclamation may be raised 95-98 percent and the hydrogen cyanide entirely reclaimed; however, the power consumption of the equipment will be relatively ideal and effective desulfuration method is the improved ADA method--i.e., the adoption of anthraquinonyl sodium disulfonate and sodium carbonate solution with air. The reagent may also be regenerated through oxidization to be used cyclically, and the desulfuration efficiency may be as high as above 99.5 percent.

The waste water of the coking plants comes mainly from the refining ammonia and the cold water of the crude benzene reclamation process. These types of wastewater contain, in various degrees, phenols, hydrogen sulfides, cyanides, sulfur canides, pyridines, benzenes, coal tar, and other harmful substances. Of these, the content of phenols and tar is higher; therefore, it is also commonly called phenol water. There are many methods of treating wastewater containing phenols, including physical methods (such as steam blowing, solvent extraction, absorption, ion exchange, etc) physical chemical methods (such as electrolytic oxidization, ultrasonic wave treatment, etc) chemical oxidation methods (such as the ozone method, the chloro-dioxide treatment, etc) biochemical methods (such as activated mud, biofiltration tank, biological rotating disk, etc) and repeated utilization methods (such as the closed-cycle method, the wastewater coke extinction method, irrigation, etc). Among the repeated utilization methods, aside from the closed-cycle method, which may be used provided there is strict management, the others are in fact not suitable at all. If wastewater is used for coke extinction and irrigation, the streamwater and groundwater will be further affected to produce even greater damage to the public. The efficiency of the various wastewater treatment methods varies with the different density of the phenol content. Generally, the rate of removal may reach over 86 percent, with a maximum of 98-99 percent; the technical economic indices of the various methods also vary a great deal.

It may thus be understood that measures may be adopted for the powdery coal dust, the sulfur-containing coal gas, the vapor smokey mist, the phenol containing wastewater, etc, of the coking plants to proceed with corresponding treatment and purification to reduce contamination and pollution and to imorove the environment. Since the enactment of China's environmental protection laws, the various plants and mining industries have all begun to pay attention to the prevention and control of pollutionants, to environmental protection, to the improvement of work procedures, to the addition of necessary environmental protection equipment, and to the strengthening of technical management. At the same time, however it is also necessary to emphasize the long-term effects. Various policies and environmental protection regulations must be studied and formulated according to the developmental principles of scientific technology and economics so as to develop environmental sciences and to study the technology of eliminating pollutants, in order to promote China's socialist construction and hasten the realization of the four modernizations.

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CSO: 5000

CHEMICAL PLANT IN GUIZHOU ELIMINATES POLLUTION

Guiyang GUIZHOU RIBAO in Chinese 23 Aug 80 p 1

[Article: "Zunyi Chemical Plant Successful in Preventing Wastewater Pollution"]

[Text] The Zunyi Chemical Plant has sincerely implemented the Environmental Protection Law and adopted effective measures to eliminate pollution of industrial liquid waste. The wastewater discharged from that plant after treatment has been inspected twice since 1 July by the Zunyi Municipal Bureau of Environmental Protection before flowing into the Xiangjiang, and it was found to meet the standards set by the state.

The Zunyi Chemical Plant is located in Zunyi city, in the upper reaches of the Xiangjiang. In the past, about [illegible],000 tons a day of the liquid waste of the plant's main production of potassium permanganate and manganese dioxide flowed into the Xiangjiang, causing extreme dissatisfaction among the residents of Zunyi. In May of this year, the party committee at the plant learned of the Environmental Protection Law and the province's temporary regulations relating to fees and penalties for discharging the "three wastes." Two meetings were held afterward to discuss methods for treating the liquid waste. Following analyses and studies, the plant's leaders, technicians and workers believed that if the waste residue which produces the liquid waste is treated to become dry waste and is not discharged into the Xiangjiang, then there will be no pollution. Thus they compress the water out of the waste dregs and cause it to become dry residue, which is hauled away every day in trucks. They also plugged up the sewage ditches in the machine shop and cleaned out the accumulated wastewater and residue in these ditches. In this manner, pollution of the Xiangjiang by industrial liquid waste has been eliminated. The plant has received praise from the masses and the environmental protection departments.

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PHILIPPINES

POLLUTION THREATENS FOUR LUZON RIVERS

Manila PHILIPPINES DAILY EXPRESS in English 20 Oct 80 p 2

[Article by Abe P. Belena]

[Text]

SAN FERNANDO, La Union Four major rivers in the Ilocos region are heavily polluted, a price close to 500,000 farming families have to pay for progress.

Aquatic life has all but disappeared in the Agno River flowing down from Benguet to the Pangasinan plain, the Bued River cascading down Kennon Road to the border towns of La Union and Pangasinan provinces and the Amburayan River running down the border towns of La Union and Ilocos Sur. And only this year, the Abra River is getting contaminated by a pulp processing plant.

Not only the fishes suffered. Studies after studies made by various government entities on the extent of damages caused by pollution showed wide and lasting destruction.

* * *

THE BUREAU of Soils regional office found proofs that mine wastes thrown into these rivers have cementing action on irrigated ricelands, choking the rice paddies. Non-organic sand disposed by the mines, unlike eroded top soil, renders ricefields infertile, soils officials say.

An *ad hoc* committee on pollution created by the Provincial Regional Office for Development (PROD) as far back as five years ago, found out that 75,000 hectares of farm lands in Pangasinan and La Union are directly hit yearly by physical pollutants from the mines in Benguet. In all, 79 towns in these two provinces receive fine sand, cyanide and mercury from the mines every year.

The impact on rice harvests, according to officials, is from 5 to 40 percent dive in yearly output, depending on how close the rice plot is to the irrigation canal or the river. The closer it is to the water source, the more is the destruction and loss in produce.

The PROD committee estimated that yearly damages in La Union and Pangasinan alone total P88 million. The extent of damages in Benguet, Abra and Ilocos Sur has not been studied.

* * *

IN 1977, 12 mining companies in Benguet were milling raw ore at the rate of 46,000 tons a day. This year, the Bureau of Mines estimate has gone down to 38,000 metric tons daily with only nine of the mines fully running.

Only a small fraction of the pulverized rocks is extracted, 0.05 percent of gold and 0.5 percent of copper.

The rest are impounded in tailings ponds and rock dams. Part of these mine silts is carried downstream every day. The rest are flushed to the same rivers during heavy rains.

At their present production rates, the mines process some 12.96 million tons of mineral ore in one year, more than 99 percent of which turn to waste or silt.

But the mines are quick to deny any part in the pollution of the rivers. Most of them, with the exception of Black Mountain and Benguet Exploration, point at their "permanent" pollution control dams.

BUREAU of Mines Regional Director Benjamin Obra, however, observed: "When you see white glowing sand at the banks of a river after a flash flood, you'll know that the mines opened the floodgates of their dams during the flood. They usually do this to extend the life span of their impounding ponds and prevent the collapse of their dams."

A lot of proposals have been advanced to solve the problem. In 1978, the Japanese International Cooperative Agency (JICA) was commissioned by the Philippine government to make an extensive study and its recommendations.

The JICA supported an earlier plan to build a "common tunnel-launder-pipeline system" from Benguet to the Lingayen Gulf in Pangasinan. The project would require some P447 million. To make it self-paying, the mines will be asked to pay the government P2 per ton of waste piped through the system.

CSO: 5000

THAILAND

UPSTREAM DAMS SAID TO LEAD TO SEA WATER ENCROACHMENT IN SAMUT SONGKHRAM

Bangkok SIAM RAT in Thai 16 Sep 80 p 5

[Thoughts From the News Column by Prachop]

[Excerpts] Recently, the newspaper THAI RAT published a story concerning the troubles of the people in Samut Songkhram Province, troubles that have arisen from the fact that sea water has encroached upon their gardens and fields. Hundreds of thousands of rai have been affected for many consecutive days. At the same time, the channel 3 radio and television station also reported the same news.

Samut Songkhram Province is located at the mouth of the Mae Klong River and, therefore, it is a coastal province. But at the same time, most of the people attend orchards and gardens for a living, especially coconut orchards. The crops grown include pepper, onions and garlic, which people in general refer to as Bang Chang pepper. And a type of fruit which the people of Samut Songkhram have become famous for is lichee. Because the primary occupations in Samut Songkhram Province are fishing and gardening, the province has been praised for being the province whose people pay the most taxes as compared with other provinces with a similar area and population.

It is believed that an important reason for the destruction of the fertility of Samut Songkhram is the construction of dams at the head of the Mae Klong River. There is the Wachiralongkon Dam, built in 1975, that is located approximately 4 kilometers south of Kanchanaburi Province and there is the Sinokkharin Dam on the Kwei Yai River, which is the head of the Mae Klong River, that is located approximately 72 kilometers north of Kanchanaburi Province and that was built in 1979.

The reason that the people in Samut Songkhram Province firmly believe that these two dams are the cause of their troubles is that after these two dams were built, Samut Songkhram Province experienced serious drought for 3 consecutive years. And 1979 in particular was a year of great suffering for the people of Samut Songkhram because sea water encroached on their gardens and fields to an unprecedented degree. Even in areas where there has always been fresh water year-round, such as in Amphawa and Bangkhonthi districts, salty water, or sea water, spread everywhere.

But worst of all, when [the people of] Samut Songkhram Province began experiencing losses and troubles from sea water, or salty water, encroaching on their gardens and fields, they appealed to government sector after government sector for help but no one has been able to help them solve this problem. Some officials have even caused the people more distress by telling them that this is a natural disaster for which no one can be blamed.

As it happens, I have been involved with this problem since the beginning. When the government formulated plans to build the Wichiralongkorn Dam, the people in Samut Songkhram Province went and expressed their alarm about the problem of salty water encroaching on their coconut and fruit orchards since [they felt that] after the dam was built, the water that had flowed in and kept out, or limited, the salty water would decrease or be exhausted and this would allow the salty water to encroach on the land that they used to plant gardens and fruit and coconut orchards. And such work can be said to be the principal occupation of the people of Samut Songkhram. Thus, it was only natural that they went in alarm and asked whether the government had preventive measures or whether the government had thought of a way to help them concerning this matter.

The governor of Samut Songkhram Province at that time was Mr Thawatchai Dechattiwong. He arranged a meeting with the people who were alarmed about this matter and he invited officials from the National Development Board to come speak. I had a chance to attend this meeting as a reporter and as a resident of Samut Songkhram Province.

After the officials had spoken and responded to the broad questions asked by the people, things can be summarized by saying that the officials concerned admitted that the people living in the southern part of Samut Songkhram Province, that is, in southern Amphawa District, would experience difficulties. They were asked to think of this as a sacrifice because of the benefits resulting from the construction of the Dam. The construction of the dam would enable there to be an adequate amount of water for thepeople living in several provinces north of the dam to use in crop growing. When crop growing had good yields, rice production would bring in money that could be used four the joint development of the country.

These comments by the government officials did not do much to help clear up the doubts of or satisfy the people. No one understood why it was the people of Samut Songkhram Province, who are Thais who have played a part in defending the country and who have paid taxes to the state just like the Thais in other provinces, who had to be the only ones to make sacrifices and endure the difficulties while the people in the provinces to the north of the dam received all the benefits, or had plentiful supplies of water for planting crops. When trying to find sources of water for agriculture for the people living north of the dam, the correct thing would have been to think ahead of time about ways to eliminate the difficulties for the people living south of the dam or ways to help the people. Also, they should not have been abandoned or left to face their fate alone as if they were people from another country.

Twenty years have passed since then. The fears of the people of Samut Songkhram Province have clearly become a reality everywhere. In fact, while it is claimed that the reason for recent troubles is that there have been unusually severe droughts which have resulted in there not being enough water in the reservoirs north of thedam to release to help counter the salty water, the truth is that, while the above is partly true, it must not be forgotten that this is a matter of nature and it has happened in the past. But the people did not experience difficulties or they experienced only minor problems since they could rely on the water from the headwaters of the Mae Klong River to keep out most of the salty water since a dam had not yet been built. Thus, when a dam is to be built, these problems should be discussed and ways to protect things should be found beforehand.

The reason that the government, including those with administrative power and the scholars, is unwilling to consider the troubles of the people is that Thailand's system of government has never considered the interests of the people to be very important. In building a dam, the government has looked at things only from a technical standpoint and from the standpoint of the benefits to be gained. It has never considered the disadvantages. What is important is that in building dams in the various places, billions of baht must be spent and it is only natural that someone must benefit from this. Whether it is the people who loan the money or the people who spend the money to build the dam, the fact that the people must encounter difficulties is not a problem that they must be concerned about or give attention to.

There are presently rumors about government plans to build dams here and there. I would, therefore, like to bring up the problems and troubles that the people of Samut Songkhram are presently encountering and discuss them for the lessons involved. Along with this, we should review things and think about the possibility of just some people having to endure the troubles or having them share the troubles with people from other areas. Because this could lead to creating disparities or conflicts among the people and this would, in the end, be dangerous to the security of the country.

Besides this, I also think that it would be proper for the government, or the government units that are concerned and that are responsible, to mobilize its power and wisdom in order to quickly find ways to solve these problems or help ease the troubles of the people, troubles that have arisen because of the careless actions of the past governments. Because if the people become troubled, they may together do something improper or violate the law because of not being able to control themselves any longer.

11943
CSO: 5000

WELL-DRILLING TO BE HALTED, BANGKOK SINKING

Bangkok SIAM RAT in Thai 11 Sep 80 pp 1,12

[Article: "In 5 Years, Underground Water Will Not Be Used In Order to Keep the Land From Sinking In the Bangkok Area"]

[Text] The City Planning Office has made preparations to implement measures to keep Bangkok from "sinking" and becoming permanently flooded. The main cause of this is the drilling of many wells to obtain underground water both in Bangkok and in nearby provinces.

Mr Nit Hinthiranan, the head of the City Planning Office, has discussed the crisis facing Bangkok. He stated that the Department of Mineral Resources sent the City Planning Office a report on this matter because the Planning Office is the unit directly responsible for this.

The head of the City Planning Office stated that, at present, the underground water sources in Bangkok are not being adequately replenished in a natural way because much water is being pumped for use. This is causing problems, the problems being that the land is sinking, the water has become brackish and the water levels have gone down, changing the quality of the water.

"For these reasons, flooding is becoming a chronic problem."

The head of the City Planning Office further stated that, at present, 1.1 million cubic meters of underground water are being pumped every day in Bangkok and the neighboring provinces.

"If we allow this to continue, the water level will drop rapidly and the water will disappear completely. And if there is still some water left, it will be so deep that it will not be worth the cost to pump it. Also, if this happens, sea water will encroach instead."

The head of the City Planning Office expressed surprise that the land is sinking at such an alarming rate.

"The Department of Mineral Resources wants the City Planning Office to cooperate in solving this problem by finding ways to extend the city water service area to areas where much underground water is being pumped, such as in the industrial zones in Samut Prakan Province, for example."

The head of the City Planning Office also stated that, concerning this long-term project, the Municipal Water Works is implementing this in order to completely "halt" the use of underground water within 5 years.

"Beginning in 1986, permission will no longer be granted to dig underground wells in the areas where such an alarming situation has arisen."

Mr Nit Hinthiranan stated that public relations activities will have to be carried on with the industrial associations or institutions so that they become aware of the problems that have arisen. And it is also essential that they cooperate in solving these problems.

"As for city planning, the government sectors must cooperate with each other in setting some standards to solve this problem.

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PLANS FOR ENVIRONMENTAL PROTECTION PUBLISHED

Budapest FIGYELO in Hungarian 20 Aug 80 pp 1-2

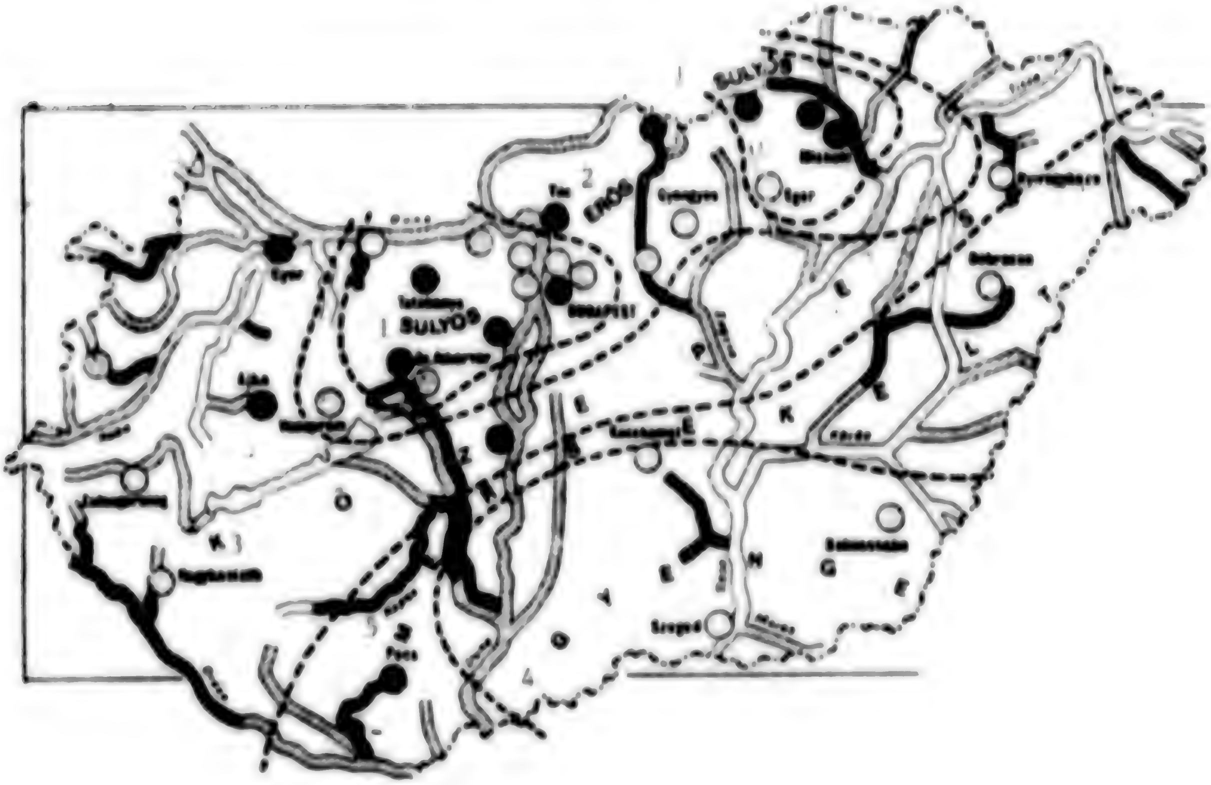
[Article by Dr Gyorgy Gonda: "The Domestic Concept"]

[Text] Clear, healthful water is precious, good clean air is less and less available, and arable land, like other natural resources, is decreasingly available. For this reason protection of the environment has become an everyday task in our country. This is a worldwide concern, and these problems are even more overwhelming in the industrially developed countries. Here are some data which indicate the changes and concomitantly the concerns involved.

In a single hour on earth 6,000 hectares of arable land are removed, and during this time approximately 10,000 new infants demand nourishment. In a single hour 685 tons of oil and petroleum products pollute the seas of the world. In the same period of time approximately 1,600 more automobiles are put on the roads (and mean, along with convenience, an increase in air and noise pollution). There are also alarming examples in our country as well. Four years ago, when the law on protection of the human environment was passed, changes and dangerous emerging effects were already making such measures necessary for us.

It has become clear that the self-purifying ability of nature is limited. Therefore it is necessary to make regulations so that other indispensable assets, the elementary state of water, air, arable land, the animate world and the human environment will be protected. In the last few years there has already been a strengthening of the realization that state intervention is necessary on the one hand and that on the other hand social interest and responsibility must be aroused. We have achieved results in both, although the state regulations are not sufficiently effective and the attitude of society is not sufficiently responsible. The environmental protection tasks generally mean more expenses for the state and for management than in the past (and the conditions for this are not the most

Evaluation of Water and Air Pollution



Key:

1. Very heavily polluted
2. Heavily polluted
3. Medium level pollution
4. Lightly polluted
5. Moderately polluted

LEGEND

Surface water quality

Clean or slightly polluted

Moderately polluted

Heavily polluted

▬ Very heavily polluted

Air Quality

Development with moderate pollution

Development with significant pollution

- - -Air pollution of a regional nature

favorable), while society--with due regard for conspicuous exceptions--has paid and is paying attention to these phenomena only through the effects of natural forces, namely the very perceptible deterioration in the condition of [Lake] Balaton.

But there is not enough strictness to dissuade enterprises and society alike not to pollute the environment. Misdemeanors and various fines (for water and air pollution) from the Penal Code can influence the proper attitude in the right direction, but some regulations must be amended because, if the fine is not motivating and is not in proportion to the damage or danger generated, it cannot achieve its goal. The controls will be inadequate.

A new concept has already appeared in the Fifth Five-Year Plan: an Environmental Protection Fund. However, the fact that a total of 0.5 billion forints went into the fund means that the amount is not in proportion to the gravity of the tasks, but represents only some kind of initial step. With the aid of the fund another 1.5 billion forints could be used in the plan period (with the addition of enterprise resources), which would render it possible to compensate for some of the earlier mistakes and negligence. The total available from fines for air pollution is somewhat greater, and this is returned to plants where equipment helping to reduce pollution has been installed. The plants themselves must more and more frequently look to their own financial resources to install additional environmental protection equipment. The Kazincbarcikai Vegyi Kombinat and the Pecsi Borgyar are good examples of this. However, these actions also require that suitable industrial support be available. (The environmental protection industry has developed very significant activities in some countries). The Tatabanya "Vidus" and the Szellozo Muvek have very sensibly recognized that they can count on demand increasing in these activities, and perhaps not in the domestic market alone.

First: The Protection of Nature

Science has been devoting a great deal of attention to the protection of the environment for a long time already. It has been considered a constantly significant topic at the general meetings of the Hungarian Academy of Sciences and has been given a corresponding status in the work of the individual sections and academic institutes. Investigations connected with the Balaton situation, their relationships and qualifications, and elaboration of comprehensive proposals stemming from these investigations should be given more attention. One important event in the very recent past was an appraisal of agroecological potential, which produced very valuable ideas on the domestic possibilities in renewable natural resources. They also set up the details of a special research program entitled "Protection of the Human Environment," and the subjects to be dealt with during the Sixth Five-Year Plan period, so that practice can be supported by the requisite guidance.

In the past years we have made great strides in protecting our domestic environment. Protective conditions, often very modest, have been established on some 430,000 hectares of land. The situation in the three National Parks is more favorable, and these comprise approximately one-fourth of the protected areas. Since only very modest sums could be allotted for the protection of nature in past years, the value of the aid provided and being provided by scientists, students and protective environmentalists is great. Unfortunately, however, there is still considerable lack of understanding.

In opposition to the frequent rather unfavorable attitudes, it must be said that the circle is widening and that more and more people are accepting a role in the protection of the environment and of nature. The Patriotic People's Front has great traditions in this activity. Zealous specialists and social activists are working with a great deal of competence and enthusiasm. In the past 1 or 2 years the trade union movement has also become involved in this work. Protection of the environment in the plant and at work stations has been inserted into the tasks associated with plant sanitation and worker safety. Its effect on work stations, and elsewhere as well, can be advantageous. The collaboration of youth has also expanded. The work and interest of university students and of pioneers, and programs of clean-up activity and camps mean that there are also successes here.

The past has seen the development of the organizational conditions which are necessary for planned, purposeful work. For the purpose of implementing the environmental protection law, the National Environment and Nature Protection Council was formed with an indispensable role, as a govennment committee, in the area of systematic review of coordination and supervision throughout labor. The National Environment and Nature Protection Office was established as the highest national authority, both directs and coordinates branches, and solves problems in the protection of the domestic environment and nature with the instruments of state administration. On the basis of government measures, commissions assist the work of the capital and megye councils, and the environmental protection secretaries have begun their activity at the side of the capital and megye executive committees. With the council apparatus the secretaries aid in the environmental work of the internal and external--non-council--organs, collaborate in coordinating tasks, and simultaneously form the contact between the Office and the councils.

Seven Advisory Boards were formed in the country to support local tasks exceeding the functional sphere of the councils. Measurement stations (posts of the Office of Clean Air Protection Measures) were established with them to take the required measurements and to set up necessary measures.

At the beginning of this year, among these direct preliminaries and conditions, the Council of Ministers adopted the Environmental Protection Concept and Requirement System, which we also include in the long-term program of implementing the law. We could also say that this is the strategy of national protection of the environment. What in it must be considered particularly important? The Concept established that protection of the environment is part of the economic production processes. Nothing is optional, and in particular there is no other solution than joint work with production and production procedures. Responsibility and the division of labor follow from this principle.

The managers of economic production activity are also responsible for the effects, and above all for the prevention of the effects which their activity causes or can cause in the environmental balance, or in the adaptive or resistant ability of the environment. An important basic principle is that we do not engineer environmental protection for the ultimate prevention of damage, but to prevent risk of damage. This is the path of the future. In agreement with this idea is our attempt to discuss, not simply the prevention or elimination of risks, but rather the planned and forward-looking development of the environment. Therefore another essential element of environmental protection is regional planning.

Protecting the Next Generation

In viewing the complex nature of environmental protection we primarily find a series of technical and economic measures, but man stands in the center of them. This includes the protection of human health, the prevention of deleterious effects--possibly genetic modification—and an assurance of living conditions for the next generation. But man also stands in the center of environmental protection in the sense that only conscious human action can be helpful: knowledge and attitude, competence and responsibility.

The idea that efforts should be made in management and in other areas to foster the environment and to reduce the burden on it has also been given an important role in the Concept. Environment-pampering management is the essence of modern environmental protection. Let us admit that our understanding often entails a merely superficial economy and not an attitude which always involves this essence. Of the internationally known concepts of environmental protection, the one most often applied is management with little or no waste. It is clear that this is not simply a matter of pampering the environment, but of management much more efficient than that of today, dealing with materials and energy much more rationally than we are accustomed to. (If only objective relations would also force us to this conclusion!). Let me digress a little and mention that this kind of environmental protection no longer means added costs, but can be understood as a path which can lead to the formation and preservation of new wealth. This brings us to another essential point, natural resources. We must partially consider individual elements of the environment as such (water, arable land, air), and partially within the general protection of the development of the environment through the management of resources. We must regard the matter of renewable resources as the focal point, not only and not primarily for reasons of environmental protection. We must also deal with nonrenewable resources. Let us think of the reserves and use of minerals, and also of the preservation and pampering of the environment.

One of the obstacles to a requisite understanding of our domestic environmental protection is that we have a narrow concept of things and phenomena and do not deal with their comprehensive, universal connections in their joint effects. The idea is sometimes reduced to a kind of national house cleaning. We must not underrate it. However, contemporary understanding and positive relations require a great deal more, in recognition, deeds and measures, not periodic activity but actions labelled by constant attention and care.

In connection with the Concept we must especially speak of industrial wastes (and partially of agricultural wastes). Even today we are far from being able to use technology with little or no waste on a broad front. A great deal of waste is generated, some of a dangerous, toxic nature (according to a 1976 estimate, approximately 350,000 tons are produced annually in our country). A considerable part of this is valuable, worth recycling, part should be stockpiled, and part should be destroyed. (This is a great source of concern for the pharmaceutical industry). With the cooperation of industry it is necessary to establish a network of waste-handling plants which will be used to accomplish this task. Using international experience we would like to see the first such plant implemented during the Sixth Five-Year Plan, with the existence of one or two more anticipated. We must do this unless we want to create or accept a situation of serious risk. The second great set of problems is the large-scale amount of liquid manure originating in stock-raising farms, where a start has been made in handling and using it, but no procedure has been developed yet which can exploit all of the assets in a wide range. Several hundred stock-raising farms will mean a serious risk and will generate a high degree of pollution.

We must also speak of household, so-called community, wastes. (Annually each inhabitant generates about one ton in the cities!). Organized collection and dumping has been expanded, and the Budapest garbage incinerator is being built, but we still find on the whole that the edges of the cities and villages are full of random dumps. Here we need more regulations, a more disciplined attitude on the part of society and greater strictness. (But from the councils we need more energetic organizational and supervisory action). To recapitulate, the ever increasing quantity of wastes is one of the most crucial problems in environmental protection.

Water, Air, Arable Land

Water, air and arable land are the three most important elements of nature, and their preservation requires the utmost attention. Speaking of water, and in this area the National Bureau of Water Conservation has the primary role and responsibility, two points in particular must be mentionned. One of these is the discrepancy which develops between supplying potable water for the public utilities of the developments, and the removal and purification of household sewage. A water supply is a developmental good demanded and supported by everyone, but what happens with the sewage hardly seems to be of the same urgency. It would be good to compensate for this backwardness in the Sixth Five-Year Plan. The second major subject is the Balaton. Long years of neglect and blunders must be remedied within a few years so that the Balaton can fulfill its purposes in a way best suited to its status and potential. In 1979 the Government made two important decisions, the first on water quality and the second on the organization of the Balaton area. Playing a role in the decision-making were the renovation of the Kis-Balaton, the fate of the Keszthely Basin (the most critical area), the arrangement of shore-line construction and many other tasks.

With respect to air pollution, the fact is that there is already some noticeable improvement in some cities (for example, Ozdon), but where there are critical branches of industry, cement plants for example (Vac, Tatabanya), some of the major and more demanding tasks are still lagging. In many places the use of the principle of clean air defense is already reducing concern. The increasing automobile traffic is also an important source of pollution.

Our most serious interests are linked with the protection of arable land. Reclamation and recultivation of previously abandoned areas deserve more attention. There are enormous losses because of the growth of developments and the modernization of the highway network for industrial plants and agricultural construction. Agriculture already uses annually some 20 billion forints worth of chemical fertilizer and insecticides. However, their use (and also their storage and transport) is still often unprofessional and therefore pollutes the water and the environment. Competence and austerity can greatly help to improve agriculture. (A recent example: It is not at all certain that environmental protection costs more!).

Sanitation has a very special role in environmental protection. The ultimate values, which make environmental pollution acceptable to man, must be based only on the scientific and specialized dependability of sanitation. Sanitation has a major role in supervision.

International Conditions

Dependable implementation of these tasks entails numerous international conditions. The geographic position of our country particularly supports this idea. Therefore we must develop contacts and cooperation with neighboring countries, but in a similar way we must also participate in environmental work in the CEMA countries. Research collaboration is stronger today than the efforts directed toward the manufacture of tools and the joint formation of necessary industrial conditions. We share many joint tasks in this. In the spirit of the 1972 Stockholm environmental protection conference and the Helsinki Final Clause, we are also participating more extensively in international cooperation. In autumn last year at the conference held in Geneva with Hungarian collaboration, cooperation was successfully rooted in the matter of transborder air pollution and technologies with modest wastes.

Today the most urgent task is connected with the preparations of the Sixth Five-Year Plan. As a goal to be reached, the Concept specifies that in the near future environmental relations are not to deteriorate, while improvement in critical areas should be tangible. This requires that every new investment or reconstruction should be implemented in such a way that its relations to environmental protection be examined first, and that care be taken in the plan for the prevention of substantial harm and for necessary concomitant conditions. Whatever still remains under any guise can only be remedied later after substantial, thorough studies and with greater expenses. This must be avoided. As far as compensation for old negligence is concerned, measures must be taken prudently and in a good sequence. We must deal on a priority basis with such questions as the environmental protection of the Balaton area, the matter of dangerous industrial wastes, some critical branches of industry and so on. The plan will certainly guarantee the most elementary conditions with which solutions can be fostered and stimulated. This can be helped by the central base, which has already made a modest contribution in the past plan period in eliminating some dangerous situations. We must also count on the fact, resulting from the nature of the tasks, that there is also a possibility of unplannable and unforeseeable intervention necessary to safeguard human life and health, if the situation should demand this.

There are two more tasks associated with the Concept. One is that the interested ministries and highest authorities elaborate their own ideas for environmental protection activity in the areas governed by them.

The second task is for society to become acquainted with the essence of the Concept. Unanimity, support and supervision! Everything which society can be asked for can be summed up in these terms. And this is not a demand which can be separated from the interests of society nor from personal interests. We are speaking of ourselves, of the narrower or wider world in which we live and in which our descendants will live. But for this we must safeguard the balance, the assets and the conditions of human life in our environment.

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DETAILS OF TIMBER CONSERVATION PLAN GIVEN

Salisbury THE HERALD in English 21 Oct 80 p 6

[Text]

LAST week's symposium on energy in Salisbury highlighted the massive consumption of wood for cooking, heating and building in Zimbabwe and posed some possible answers to the problem of our diminishing number of of trees.

Plans are going ahead to provide woodlots in the rural areas and the Government is placing emphasis on the training of foresters to administer the schemes and the education of the people in the importance of trees, how to look after them and indeed how to plant them.

The symposium delegates heard a number of papers on the subject from local experts and listened with a great deal of interest to two presented by visitors.

The U.N. Food and Agricultural Organisation representative, Mr J. E. M. Arnold spoke of wood fuel in world perspective and outlined some of the work being done in other countries.

Of particular interest to delegates was a scheme being carried out in South Korea. He explained that large village woodlot programmes have been built up through village forestry associations — a form of co-operative.

"Planting is mainly on private lands, with owners turning their land over to the associations for planting on a profit-sharing basis," he said.

Output was shared among members in proportion to the labour they contributed, on a voluntary basis. The Government fully subsidised all cash costs and supported extension services.

COMMITMENT

Three years ago there were 21 000 village forestry associations throughout the country.

From this, and other experiences in other countries he discerned a number of features among them was that of a strong government commitment to the success of the schemes backed by the political will to take such measures as change in land use legislation and the necessary funding.

Important too was the machinery at village level to enable the people to participate actively in the planning and implementation of any scheme.

Mr J. A. D. Jackson, of Malawi's Department of Forestry, delivered a paper which, among other things, outlined the steps already being taken to alleviate shortages.

He concluded that even with extension activities, nursery development and a full investigation of alternative sources of ergy, it came down in the final analysis to self-help by the rural population.

Much of the funding of Malawi's schemes comes from outside the country.

Mr Jackson outlined the steps being taken nationally to alleviate the shortage of fuelwood and poles in both the short and long terms.

The long-term aim was to build up supply by providing:

● Forestry extension to local authorities and individual farmers;

● Rural nurseries raising planting stock for sale to the public;

● Investigations of alternative sources of energy and methods of economising on the use of existing sources.

The second strategy involved an intensive afforestation programme in districts where shortages are acute and where the population density is high.

The methods being used to achieve this, he said, were:

- Strengthening the wood energy division within the Department of Forestry including the expansion of extension services.
- Establishing a network of nurseries to raise seedlings. The target is 88 nurseries each producing up to 100 000 plants a year.
- Creating rural plantations in collaboration with local authorities.
- Creating urban plantations adjacent to the major cities over a four-year period.
- Creating plantations within forest reserves, again over a four-year period.
- Investigating the use of charcoal and to gauge whether it would be acceptable as fuel.
- Establishing an energy unit within the Ministry of Agriculture to strengthen the Malawi Government's planning capability.

Mr Jackson concluded with a rather gloomy picture, however. He calculated that, with all these projects in full flower, by 1990 Malawi will be producing from them only 3.5 percent of the total projected demand for firewood and poles.'

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DENMARK

NEW COPENHAGEN WASTE TREATMENT PLANT TO IMPROVE ORESUND

Stockholm DAGENS NYHETER in Swedish 2 Oct 80 p 28

[Article by DAGENS NYHETER correspondent Bo Engzell: "Better Swimming in Oresund; New Sewage Treatment Plant Completed in Copenhagen"]

[Text] Copenhagen, Wednesday--Copenhagen has invested nearly 1 billion Danish crowns, about 750 million in Swedish currency, in a cleaner Oresund. On Wednesday all was ready for a showing of the Lynetten, Copenhagen's new sewage treatment plant, which has been built on land acquired through land fill in Oresund right next to the large oil harbor of the Danish capital. The quality of the water for swimming in Oresund, which has been rather questionable, is expected to improve considerably with the new Copenhagen waste treatment plant.

Copenhagen's waste water was previously discharged straight into Oresund without treatment -- or in any case the water was treated to a very insignificant degree. The new sewage treatment plant, which will become gradually operational, involves several stages: mechanical purification, biological purification and sludge treatment. Enormous basins have been built by the Straight, as has a large facility where the sludge is finally burned.

The treatment plant will handle waste water from a region which is inhabited by 2.4 million people and in which several industries are located. It serves not only the municipal area of Copenhagen but Fredriksberg and Gentofte as well, and parts of five other municipal districts.

The maximum capacity of the giant plant will be 42,000 cubic meters of waste water per hour!

Remaining Worries

But all the worries about Oresund will not vanish now that Copenhagen is getting its sewage treatment plant. More cities need to expand and rebuild their treatment plants, and the discharge from industries must be limited if the water in Oresund is to become really good.

This applies to, among others, the "big polluter," the Boliden Company in Helsingborg, which from its chemical plants discharges large amounts of gypsum, among other things.

In many areas of Oresund people have been forced to swim "at their own risk" in recent years. The improvements in Copenhagen will be of great importance to all of Oresund. On the Swedish side of Oresund, however, many measures remain to be implemented before the "Oresund cocktail" will achieve the highest status among "swimming pools."

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ENVIRONMENT MINISTER PLEDGES CLEANER OSLOFJORD

Oslo ARBEIDERBLADET in Norwegian 16 Oct 80 p 10

[Article by Per-Arne Bjerke]

[Text] The Oslofjord will be significantly cleaner. Yesterday parliament considered pollution in the Oslofjord. The environment minister, Rolf Hansen, was able to state that the job of cleaning up pollution problems was already well under way.

"Significant undertakings still remain. The main work is expected to be completed by the middle of this decade, but some things will be done after 1985. It is difficult to predict how great the improvement will be in the fjord.

"I don't expect crystal clear water in those areas which are today the most polluted. But it is my opinion that there is good reason to expect significant improvement in large parts of the fjord," Rolf Hansen said.

He was replying to an inquiry from Thor Knudsen (conservative). Knudsen pointed out that pollution in the Oslofjord is a problem which more or less affects one quarter of the country's inhabitants.

"Significant environmental and recreational interests are today threatened by growing pollution in the fjord," Knudsen said, and asked what the department of environmental affairs intends to do to get started work on cleaning up the fjord.

The environment minister granted that large portions of the Oslofjord do not have a satisfactory water quality level in view of the extensive recreational activity connected with the area. But this is blamed on priorities. The parliament has earlier indicated that waterways such as Mjosa, parts of Glama, Vansjo and Tyrifjord must be cleaned up first. The assumption is that steps will be taken in the 80s to improve the situation in the Oslofjord.

"Much has already been done, but much also remains," Rolf Hansen said.

The one measure which will have the most significance for the inner Oslofjord is the central treatment plant Vest. The installation will include the towns of Asker, Baerum, and Oslo west of the Akers river.

Extensive work remains to be done in the outer Oslofjord in constructing new treatment plants. There are plans to invest 300 million kr in purification projects in the course of the first years only.

Rolf Hansen was not certain that, as Thor Knudsen had portrayed, pollution has recently become much worse. An investigation made by the Norwegian Institute for Water Research concluded that the situation has not changed significantly in the course of 76 years.

The environment minister, Rolf Hansen, also stated that the department has started an extensive investigation on the use of the Oslofjord. Special emphasis will be given to the protection of nature, recreational life and cultural values. The purpose of this investigation is to provide the basis for a debate on how the sea and beach areas will be sued in the future.

And, according to the environment minister, all those who use the Oslofjord can look forward to considerably less pollution in the fjord.

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